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FACTORS INFLUENCING TRAVEL BEHAVIOR AND THEIR POTENTIAL SOLUTION: A REVIEW OF CURRENT LITERATURES

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ABSTRACT: *Traffic congestion in metropolitan areas has developed into a major problem in many countries all over the world. They have a negative impact on the economy, the environment and the overall quality of life. Time-delay, pollution, land user and stress are some of the impact that appear from congestion. This paper presents an overview of current literatures on the factors that influence travel behavior as well as their impact. Also, potential solutions to this problem are provided which represent the current thinking of transportation planners in mitigating the adverse impact of motorized traffic to the socio-politic as well as socio-economic of affected countries.*

Keywords: *Traffic congestion, travel behavior, land use, urban structure*

Introduction

Moving from one destination to another is a necessity due to working needs, leisure needs or other possibilities. Thus, travelers need to choose the characteristics of a transit that suits their needs. In a developed country, the public transport is much better because of the technologies and a well planned transportation system. Transportation planning and modeling are built on the trivially flawed paradigm that one's decision to travel is independent of the level of service on the infrastructure, or even of the existence of transportation infrastructure. A good transportation system may reduce travel cost because the less of private transport users. Economic theory advances that enhancement to the transportation system leads to lower travel cost and hence to ''induced demand.'' Most people tend to use the public transport if the systems are enhanced but there are many reasons of the travel decisions. They have their own reasons to choose the travel characteristics such as by public transport (bus, train, etc) and private transport (car, motorcycle, etc). United States planners hope that Transit Oriented Development (TOD) will encourage transit use and increase

housing opportunities, promote walking and bicycling and facilitate neighbourhood revitalization.

Factors Influencing Travel Characteristics

Travel characteristics are dependent on factor that influences the travel. There are many factors including environment, infrastructure, time, cost and others.

Location, land users and distance

Among the factors that influences travel characteristics are location, land users and distance. Thus, these factors are very important to people who choose their travel characteristic because their home and workplace are at two different locations. According to Johansson et al., (2003), time and distance influence the travel behavior in a non-linear way. People tend to feel tired and bored in long distance daily travel. The improvement in daily travel distance need to be implemented as it can reduce the travel time. In USA, due to the distance that teachers need to travel, they even create a mobile laboratory to reduce the amount of traveling that teachers have to make (Hermens, 1995). There are many solutions to reduce the travel distance like working at location nearer to home, or get entertainment at the nearest location. Concentrating housing and employment within several hundred feet of transit will produce more riders than placing the same amount of development a half mile away (Cervero, 2006). People tend to use the motorized transport either by car sharing, carpooled or car ownership when the house to work travel is a long distance away. With the dramatic growth of car ownership, distance traveled between home and work in Europe has also been increasing over the years with countries like France, Germany and The Netherlands showing levels of approximately 10 kilometers by the late 1980s (Jansen, 1993). Different with motorized transport, public transport is the best solution for traffic congestion, if the house is closer to employment, people tend to use public transport (Lund, 2006).

Availability of transport mode

In metropolitan areas where mass transit is available, it offers an attractive alternative to other means of commuting (Koslowsky, 1995). Availability of transport mode depends on the development of transport planning. Some of the area is covered by

public transport because they are high density areas as a result of good planning. But for the low density area, the availability of public transport is less and the only mode is private motorized transport. For the fast growth countries, the public transport planning is exceptionally well even in the low density area because they have the financial means to develop the public transport. Making public transport more attractive and responsive to the needs of citizens will give more accessibility to the citizens besides reducing the congestions (RosaÂ rio MacaÂ rio, 2001). Consequently, the quality in terms of travel time and frequencies that public transport undertakings are able to offer decreases in direct relation with this global level of accessibility (RosaÂ rio MacaÂ rio, 2001). This is one of the reasons that influence the travel characteristics which is the non-availability of suitable transportation mode because of the location.

Income

In wealthier countries, the developments of public transport are good resulting in some of the people do not know how to drive because they are do not have the need for driving license and car. Lower-income countries tend to have the highest vehicle ownership and mileage growth rates, higher-income countries are experiencing low or negative growth (Litman (2006). For the middle growth country like Malaysia, people who are high income tend to use car with driver and do not apply the car sharing but for those middle and lower income citizens, the only choice is public transportation such as bus, taxi, train etc as a main transport. Factors which proved to be significant discriminators among trip chain types included life cycle stage, marital status, gender, employment status, education, income, the presence of children and the residential density (Starthman, et al, 1994).

Work schedule

Time is an important determinant in travel planning. Normally, during peak hour, transport movement is slow. Trip making that pertains to trip duration, at the exclusion of other aspects such as trip length, trip frequency, and others (J Geograph Syst, 2005). Besides that, people tend to travel during holidays or working time to avoid the congestions. For those people that time is very important, as suggested by Tanner (1961), they tend to allocate the same generalized expenditures (money and time) to travel, regardless of the level of service of the transportation system (Fulton et al., 2000; and Schafer, 2000). They can afford to spend much money on travel for their

time. In the example of Texas, the building has more subdivisions resulting in more traffic. The road becomes smaller and the number of cars is growing, thus wasting the driver's time. Researchers have assumed that the more time the worker spends on the trip to work (or, for that matter, on the journey home, too) and/or the greater the distance between home and work, the more negative the psychological or behavioral outcome. (Koslowsky, 1995). Besides that, the choice of travel mode is based on time because it will make life easier. The vehicle mileage affected by the time, financial and discomfort cost of driving (Litman, 2006). This means that time is an important aspect that influences travel.

Urban structure

Urban structure is another aspect that defines travel characteristics. Census data for the Houstan metropolitan area shows that from 1990 to 2000, the share of commuters driving alone to work rose from 75.7 percent to 76.6 percent, while the share that carpools declined from 14.6 percent to 14.4 percent, and those who ride transit fell from 3.8 percent to 3.5 percent (Red Salle, 2004). This happen because of the urban growth where in the high density area, the transit and buses are available but for the city sprawl, there are big area to cover and it is difficult for transit and buses to cover all the area. Suburban growth has certainly outpaced city growth. Sub urbanities on average are covered by public transport and so are likely to be transit-dependent. It is different to the city sprawl that residents are car-dependent. These development patterns, which refer to as sprawl, have made transit service inefficient and have reinforced automobile dependence (Belzer and Autler, 2002).

Fuel cost

Each traveler needs transport to move and each transport needs fuel to move, like petrol and diesel. Fuel cost is also one of the factors that influence travel. Fuel prices are predicted to increase during the 21st century as demand grows and production peaks (Litman, 2006). Fuel price are increasing and thus will make the driver think twice to use private transport or public transport. Nowadays, traffic congestion is heavy in certain county in America as reported by TTI (Texas Transport Institute). Factoring in today's rising fuel prices adds another $1.7 billion per year (Longley, 2005). The fuel waste also grows for the solo driver who drives in traffic congested city. According to TTI study, wasted fuel, totaling 2.3 billion gallons lost to engines idling in traffic jams (Longley, 2005).

Impact of Travel

Each single thing will give impact either positively or negatively. To some commuters, the journey may be very well to utilize beneficially a lead to quit desirable outcomes (Koslowsky, 1995). The desirable outcomes may be negative if the commuters are selfish without considering others. A densely populated city which is suffering from the heavy traffic experience negative consequences like air pollution, fuel consumption, long travel time and stress (Bernadino et al. 1993; Mahmassani et al.1993; Sullivan et al 1993; Yen et al. 1994; Bernardino & Ben Akiva 1996; and Yen and Mahmassani 1997). During the travel, there are positive and negative impacts. Traffic congestion is one of the bad impacts because people who are involved in traffic congestion will waste time, fuel, and some of them will get stress from it. The smooth travel will give more positive impact like easy to travel, stress-less, save the time and money.

Time/delay

Every single time is very valuable and for some people, every minute can produce a lot of money. According to TTI, the average driver waits in traffic 54 hours per year (Sherman, 2000). This is the bad impact to drivers as their time is wasted. According to Koslowsky (1995), direct negative effects of commuting are obvious and include hours lost from work and/or leisure activities. If the commuter can use other solution to avoid congestion, they can reduce their hours lost from congestions.

Cost

Cost is the one of the issue that can be highlighted when people are commuting. Every single commuting will need cost but the different is the high cost or low cost and it depends on type of commute and the distance of commuting. Solo driver will need more cost when comparing with car-sharing. Normally, public transports are cheaper than solo driver. According to TTI, commuters in very large metropolitan regions lose $700 per year in wasted gas and time (Sherman, 2000).

Congestion/factor

The outpaced economic growth is certainly one of the reasons that contributed to the traffic congestion. Some workers commute from home-to-work and will cause

the traffic getting slow. Traffic congestion issues have led to more complex problems. Congestion indicator is on trip chaining: workers who commuted in peak periods, and non-work trips among alternative chain (Starthman et al, 1994).

Environment

Transportation pattern contribute to a range of environmental ills, economics inefficiencies, health and safety issues, and social inequalities (Belzer. Autler, 2002). Air pollution is the one of the environmental issues that gives big impact to the next generation. Smoke from car produce more carbon monoxide to atmosphere and it is not good for health. Some of people use the nearest water source to discard the waste oil from car and this will pollute the water. Transport policy grapples with the environmental and societal implications (Metz, 2005).

Social cost/stress/health/psychological

Social cost is the price that needs to be pay effect from traffic congestion. Driver who stuck in traffic congestion directly easily feel stress and pressure and these will give the bad impact to the health. All drivers tend to self-seeking behaviour like frustration and sometimes anger (Kerley, 2007). Industrial and organizational psychologists are, generally, concerned with more indirect effects including attitudinal and emotional outcomes. (Koslowsky, 1995). The drivers who are in stress, normally uncontrolled their attitudes and will do unexpected step and this will cause the car collide. The growth in commuting brought with it another source of stress to the worker (Cassidy, 1992).

Methods to Solve Traffic Problems

Traffic congestion is the problem for many countries and need to be reduced from time to time. There are many step and method to solve the traffic problems such as new urbanism, improvement of service, improvement of knowledge, improvement of time management and others.

New urbanism

Narrow path and buildings contribute to the traffic congestion. Besides that, city sprawl is the reason for the unavailability of public transport service and thus increase the

private-transport users. New urbanism, Transit-Oriented Development (TOD) will prompt American to drive less, and walk, bike and ride transit more (Cervero, 2006). New urbanism within home-to-work can be implemented where this will decrease the delay-travel. The urban parking pressures, and the enforcement process and system, that have been developed to manage the growth of rapid car traffic is a successful move (Kerley, 2007). Good system in parking such as electronic parking pricing, systematic parking lot and others will give benefit to parking management and can reduce the traffic congestion. Parking policy needs to be tailored to respond the different local conditions within the same city or urban area (Kirby, 2007).

Public transport/improved transit user information/transit service improvements

Public transport is the main solution to solve the traffic congestion problems. Transit-Oriented development (TOD) focuses on better connecting public transport systems physically and functionally with the surrounding development (Bezler and Autler, 2002). The systematic public transport will attract users where the service gives more benefits to them. Japan's and U.S's transit can be referred which produces less delay in travel compared to private transport in long distance. Besides that, transit user's information need to be upgraded on the concept of public transport which should be prepared by the Government.

Relocation of activities

Avoiding traffic congestion is the aim for those countries that face traffic congestions problems. One of the methods that can be implemented is the relocation of activities which is to relocate the workplace-residential and leisure activities place-residential area. Job-housing mix better improve travel distance than retail-housing mix (Cervero and Duncan, 2006). Residential relocation (Krizek, 2003) to the nearest connectivity public transport will influence the users to choose public transport so as to reduce the private- transport users.

Tele-working

Tele-working is the one technology that is suitable to solve the problems and the bad impact of congestion. Viewed by transportation demand management

(TDM), telecommuting has the potential to reduce the socio-economic, cultural and environmental problems (Mamdoohi, et al., 2006). Important information can be delivered easily without commute and this will decrease the road users and continuously will reduce the congestions if the tele-working systems are implemented.

Staggered working hours

Staggering the working hours is seen as one of the agents that can reduce the congestion problems. Shift time during work and rearrange the time-work is more practicable. Resistance of work commuters to altering works their schedule to avoid congestion (Small 1982, Wilson 1989).

Summary

This paper starts with a look at the importance of the travel and the characteristics of transit that suite to the needs of travelers. A systematic transportation may reduce the cost because of the decreasing use of private transport users. The literature reviewed shows the factors that influence the travel choice. Also, the impact of travel is discussed and the solution to the problems is proposed. With this understanding on the characteristics of travel, it is hoped that transportation planners will be better able to plan effectively the city so that the use of public transportation is encouraged while the use of private transportation is discouraged.

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